# The Xtal Set Society Newsletter

Volumn 25, No.6 November 2015

**In this issue (#146) November 2015)**

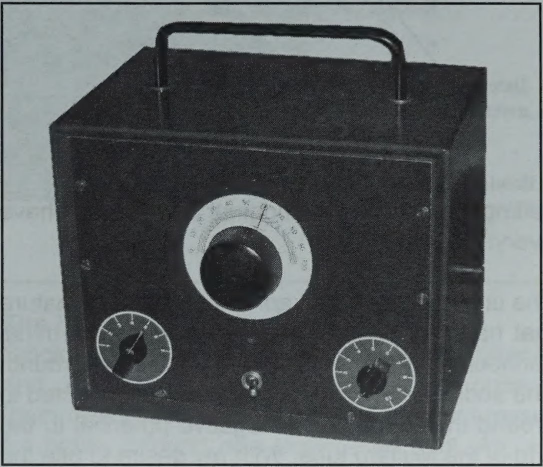
*** A Modern Eddystone AW2**
*** Three Detectors: Diode, JFET and Stock Options**
*** My Favorite Regen**
*** Ken Ladd's Rat Radio**
* Xtal Corner: Member Correspondence

## A modern Eddystone AW2 saga

by Dan Petersen - W7OIL

In the mid 1930's a radio receiver was introduced in Great Britain called the "Eddystone All-World Two". The radio was targeted to amateur radio operators and was a simple, inexpensive way to receive both amateur and commercial transmissions. The cost of £3.17.6 (three pounds, 17 shillings, 6 pence) was a good weeks wage for many folks.

When WW broke out in September, 1939 a large number of British hams had one of these receivers. When WW2 started the order came down from the government for all amateur transmitting equipment to be locked away - literally. There was a need for qualified morse code listeners (all hams were then) to monitor radio traffic and report their findings to the government. These intrepid patriots were known as Volunteer Interceptors. A huge amount of enemy signals were copied, then forwarded to the Bletchly Park's cipher-wizards to decipher. The Eddystone All-World Two was a major player in this endeavor.

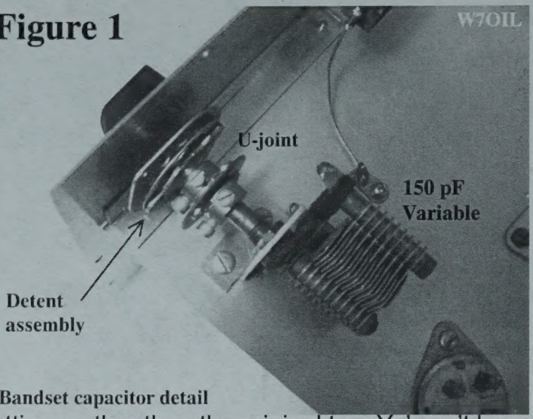


So I want to build a replica? It would be practically impossible to make an exact copy as (#1) It was a British radio with British parts, some custom made by or for Eddystone and (#2) the expense for such a project would bust my bank. My toy-money fund is pretty small. So how about a "working replica" for want of a better term? This I may be able to handle with help from "OIL's Junquebox". The project now becomes "Eddystone 2015".

Engaging in a "spider hunt" through the dusty recesses of the "junquebox" I find a steel cabinet that is almost the same dimensions of the original. It was full of unsorted parts so some sorting was in order to empty it out. Too bad that it does not have a hinged lid on top as does the original but I can work around that.

Nineteen-thirties Mullard vacuum tubes are not exactly big-box store items here in the "Colonies" nor is the dual 1-microfarad Custom Eddystone capacitor used in this rig. One thing that can be "fudged" is the special *detented* bandset capacitor. Bandset? Think of it as "coarse tuning". This enabled the bandset capacitor to be "selected" to ten discrete positions in the original. Solution? I took the detent assembly from an old rotary switch and mated it with a 150 picofarad variable capacitor (see Figure 1). Alas, my "copy" has only seven

**Figure 1**

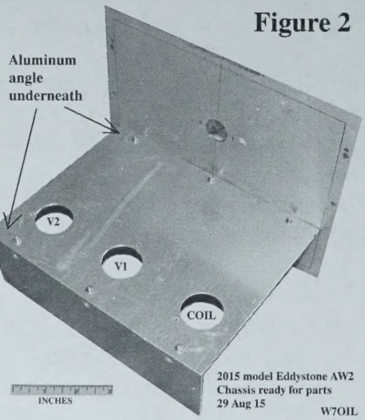


Bandset capacitor detail

settings rather than the original ten. Ya' can't have everything!

The original circuit had an unusual design feature that had the filament battery's negative terminal connected through a 1000-ohm resistor to ground. The audio section's grid resistor *was* connected to ground thus imparting a negative potential to the grid of the Mullard tube. With my desire to use the original circuit as much as possible, substituting American tubes for the British ones. So construction began.

**Figure 2**



I do not think I need to go into all of the sordid details about the construction but I will touch on the chassis. This I made from pieces of sheet aluminum fastened together with 1/2" by 1/2" aluminum angle available from home improvement stores. This angle is 1/16" thick and is ideal for all sorts of projects. The three 1.25" holes I cut out on my drill-press using a "cone-bit" available at Harbor Freight. Wear gloves when drilling stuff like this. If the drill catches you could be in for a visit to the emergency room to bandage where your fingers used to be. You don't want "Stumpy" as a nickname anyway.

All the chassis plates are secured with 4-40 screws with clearance holes in the plates and tapped holes in the aluminum-angle pieces. Back in the March, 2008 _Newsletter_ I wrote an article called "The Classy Chassis". That chassis used lexan plastic plates but the idea is the same.

The schematic for the Eddystone 2015 is almost pure "Yank". Since I am using American tubes the need to include circuitry for a "C" bias is not necessary. I have a hunch that the British "valves" needed a negative bias on the control grid to work properly. One thing I *have* adopted from the "Royalists" is picking the audio from the plate of the detector rather than on the "other side" of the feedback winding. This makes routing the audio to the AF amplifier much easier since you do not have to route the audio from the coil all the way back past the detector plate to the AF tube.

**I have a confession to make:**

I *did* wire the circuit using the English schematic, rather than the "American" one shown. When I first fired the Eddystone 2015 up no smoke was released from anywhere. That's good news. The bad news was that it crackled, popped and made generally unhealthy sounding noises in the headphones. I pulled all the rabbits out of my hat trying to make it at least resemble a working radio but alas, my wizard's wand failed me. So, get away from this thing and go assuage my disappointment with eating dinner - something tasty, deep-fried and no nutritional qualities. The next day I had a simple plan. Tear it down to parade rest and start over. Hence the "American" schematic in Figure 3.

## Eddystone 2015, Schematic
### (The American version)

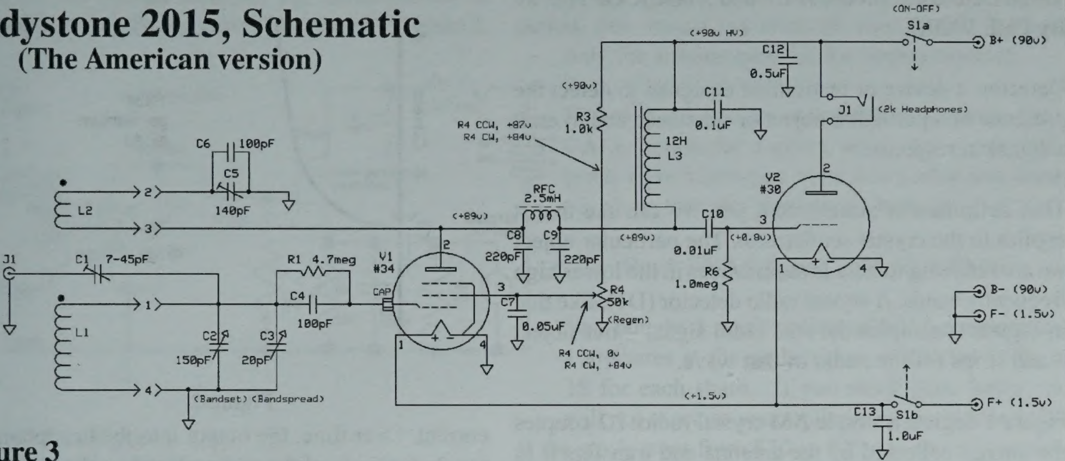


**Figure 3**

Figure 4 shows the layout topside. The bandspread (fine tuning) capacitor is mounted on a right-angle bracket with a universal shaft coupler between it and the tuning drive. At least this part of the set looks pretty much like the original. The underside (Figure 5)is quite different but the parts density is about the same.

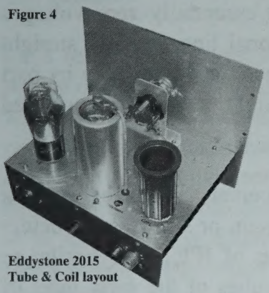


Figure 4

Eddystone 2015
Tube & Coil layout

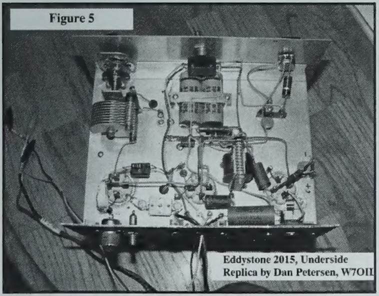


Figure 5

Eddystone 2015, Underside
Replica by Dan Petersen, W7OIL

### The Finishing Touches:

The tuning dial and the two "dial-plates" for the bandset and regeneration were done using AutoCad and my printer. Similar success could be had with CorelDraw or similar programs. I painted the front panel and the cabinet with "Leather Brown" spray paint.

### Fire it up...again:

Smoke test time again. Hook up the batteries and...nothing. I try my best incantations, none of them repeatable in polite society, and gird myself for battle. I found one unsoldered joint. Ah, we have noise in the headphones. Advance the regeneration and...nothing. When that happens with a "jenny" (slang for a regenerative receiver) swap the two feedback wires. Shazam! We have regeneration! I lightly tap the top of the detector tube and hear a healthy "bonging" due to microphonics. Get used to it - most jennys do this. Now for the acid test...

I have find this set to be a good performer on the 40 meter ham band and on the 49 meter SWBC band. The tuning is smooth as is the regeneration control. It acts just like a 1935 radio should - a bit drifty, no AGC and usually several signals being heard at the same time when the band is busy. But you get to hear signals the way the British VI's and hams of the period did.

I am amazed to think that this is the **70th** article I have written for the XSS *Newsletter*. I wish to thank the Queen Mum, Her Prince Consort and best of all, my readers in sticking with me. Dan Petersen - W7OIL

# Three Detectors: Diode, JFET and STOCK OPTIONS

By Phil, W0XI

Detector: a device or instrument designed to detect the presence of a particular object or substance and to emit a signal in response.

That definition is quite broad; yet, we can see that it applies to the crystal set detector. The particular object we are referring to here is radio waves in the lower high frequency bands. A crystal radio detector (D1), like that in Figure 1, samples the AM radio signal – our object – and strips off the audio of that wave.

Figure 1 depicts a simple AM crystal radio. L2 couples the energy collected by the antenna and transfers it to the tuned circuit, L1 – C1. The signal is then rectified by the diode, D1, and is transferred to the load, R1. C2 is added to strip off any remaining radio frequency energy, leaving the audio signal which is dissipated in R1. R1 can take many forms; but is usually the combination of a step-down audio transformer followed by a pair of earphones – at least the simple sets in the early days of radio.

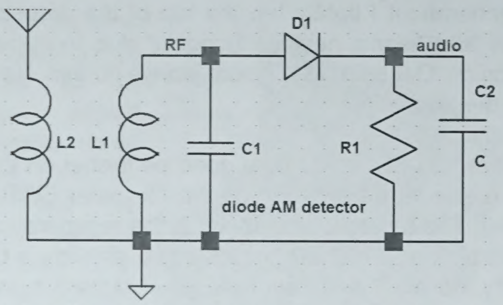


Figure 1

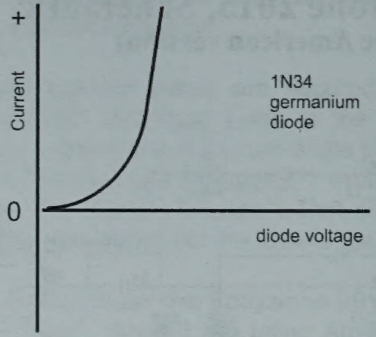


Figure 2

When a single-ended detector, like that in Figure1 is used, the detector curve required to emit the audio at its output is that shown in Figure 2, a typical diode curve. When the RF signal is positive relative to the voltage across the load, R1, the diode will conduct, thus reestablishing the voltage across R1. When the RF signal swings below the voltage at R1 it does not conduct any current. Over time, the output into the headphones is a rough duplicate of the audio placed on the radio carrier back at the radio station.

Some draw diode curves like that shown in Figure 4, with a horizontal line at essentially zero voltages followed by a straight diagonal line – nearly straight upward. In general, the curves for diodes vary by part number and makeup. In general the diode is considered a square-law device.

Figure 3 presents an AM receiver that makes use of a Junction Field Effect Transistor, or JFET as the detector. The characteristic curves of JFETs are similar to the old triode and pentode tubes of the early days of powered radios.

C6-L2-C7 make up an antenna tuner. The signal generated by the tuner is then magnetically coupled into the traditional crystal radio tank circuit, L1-C3. The signal is then AC-coupled onto the gate of the JFET. And here is where this radio departs from the traditional crystal set as in Figure 1, the input impedance of the JFET at the gate is very high. As such little or no current is drawn by the JFET. It simply samples the voltage which reappears at the source of the JFET, that is, at the top of R2. This arrangement thus preserves the voltage generated at the top of the RX TANK, L1-C3. Due to this arrangement the amplitude of the radio signal is preserved; that is, the detector does not drawn down the energy of the thank, as happens with the set in Figure 1. Thus stronger signals are maintained; more stations can be heard. The output for the set is taken from the source, i.e. the voltage atop R2. The audio portion of the circuit can thus be the same as that used in Figure 1.

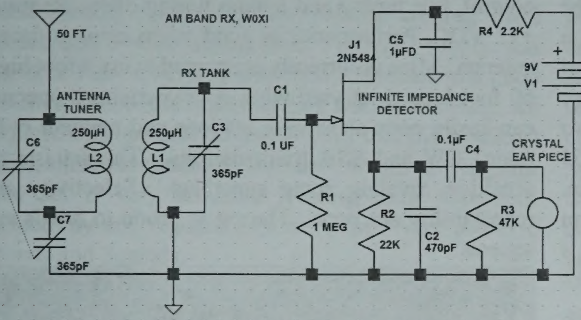


Figure 3

Finally, we arrive at the stock option detector. Why do I call it that and how do stocks or options on stocks have anything to do with detectors in crystal sets? That's a fair question!

Let's return to our original definition of a detector: a device or instrument designed to detect the presence of a particular object or substance and to emit a signal in response. Well guess what; we can apply this detector definition to the characteristic curves to stock options just as well as to radio detectors. The eerie thing about it is that the "At Expiration Diagrams" of CALL options look pretty much like the diagrams for diode detectors!

An option is a contract that gives its owner the right to buy or the right to sell a fixed quantity of an underlying security at a specific price within a certain time constraint. Of course, to get such a deal, one must pay a price; nothing is free in this world including the markets. For example, suppose that you wish to buy 100 shares of stock in XYZ company in a month or so when you'll have the cash. However, you are thinking (guessing) that the market will be going up between now and then. You have the choice to buy an option now with an expiration date several months out paying a small percent of the stock purchase price to buy the option. At expiration of the option, given that the stock value is higher, you can chose to buy the 100 shares of the stock at the strike price of the option when you bought the option. If the stock went down over that period, you would not exercise your option but lose only the amount paid for the option contract.

Figure 4 denotes an at expiration diagram for a CALL option for a given stock at a given strike price. Here's how you write down what you wanted, given that you went ahead with it:

Buy1 XYZ 2-month 20$ call at $1.00.

You bought 1 stock option of XYZ company for 100 shares at the strike price of $20 for $100, or 1$ for each share. If you stock goes down you will not exercise your option and you'll lose $100. If the stock went from $20 to $25 per share at expiration then you'd have the right to exercise the option contract and buy the 100 shares of XYZ at $20 per share. You total gain would then be 100*25 or $2,500 but you'd only pay $2,000 for the stock.

So what's the dotted line in the graph? It's the curve at the beginning of the contract. Over time the dotted line comes down to align with the solid hockey-stick at expiration curve.

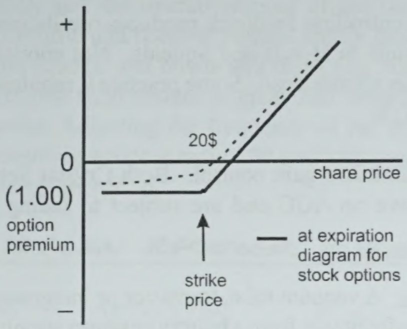


Figure 4

So there you have it. Different fields of endeavor often have a somewhat common basis in math. A detector can be a device designed to detect the presence of a particular object or substance and to emit a signal in response.

# My Favorite Regen Receiver

Chip Olheiser, W7AIT

Crystal sets are fun, but my very first radio was the Span Master regenerative receiver Knight Kit. As a 12 year old, I had no experience soldering and sort of made a mess out of the wiring, but it worked. Since then I learned to solder, and have built and used two more regenerative receiver kits, the Ten Tec 1253 and the MFJ-8100K World Band Short Wave Radio. This article is about these kit radios, some regen term definitions and a little about how they work. For a surprising conclusion, I tell which of the three works best for me and why.

## Regen Definitions

Regen: Regenerative design involving feedback, adjustable by the operator.

Regeneration Gain: Properly adjusted regeneration provides for gains up to 100 and perhaps higher.

Feedback: Typically the return (or feeding back) of the output to the input of an amplifier.

Oscillation: Controlling feedback produces oscillation. Too much results in Howls and Squeals. Not enough and the receiver sounds dead. Some practice is required to get it just right.

No AGC: Automatic gain control. Both Crystal Sets and regens have no AGC and are subject to fading / rising signals.

Active Device: A vacuum tube, transistor or integrated circuit; all require power from a battery or power supply. Regens require some sort of power vs. crystal sets that are usually self powered by the radio waves received.

Advantage: Regens rival superhets for sensitivity.

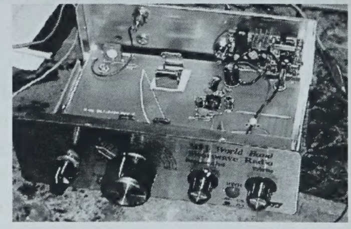
A Bit of History: Regens were used extensively aboard German U-Boats in WW II; Allied forces used them also; and, they devised methods to track down the U-boats by searching for the oscillating signal generated by those regens.

## Ten Tec 1253

This is a transistor regen receiver covering selected SWL bands. Has band switch, a regen control, volume control, fine tuning and a main tuning dials. Requires +12 VDC. Performance is good when using a decent antenna. Mine is currently connected to my 9 foot high, 60 foot long front yard wire. An experienced operator can easily copy shortwave stations and amateur radio (ham) CW and SSB transmissions. The set is very sensitive, rivaling some superhets. Selectivity and repeatability are poor. The rig is prone to howls and squeals.

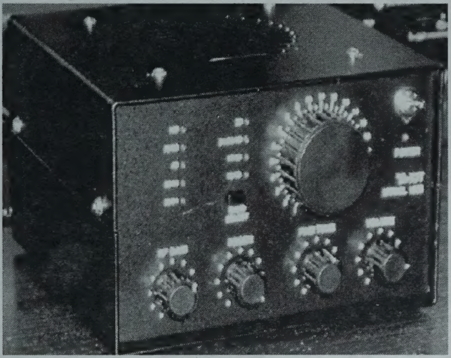
## MFJ-8100K World Band Receiver

It's a transistor regen receiver covering selected SWL bands. Has band switch, regen control, volume control, and main tuning dial with Vernier fine adjust. Requires +12 VDC and headphones or an amplifier when using speakers. Performance is excellent when connected to a good antenna. Mine is currently sharing my antenna with the Ten TEC outlined above. A beginning novice operator can easily copy shortwave stations and ham CW and SSB. The set is very sensitive. Selectivity and repeatability are very good. The set is not prone to Howls and Squeals due to advanced but straightforward design additions.



## Knight Span Master

This is a two tube regen receiver covering from the broadcast band through 30 MHz. It features a band switch, regen controls, volume control, band spread and a main tuning dials, 110 VAC supply, and speaker. Performance is excellent connected to a good antenna. Mine was at 40 feet high and 50 feet long. An experienced operator can easily copy the AM broadcast band, shortwave stations and ham CW and SSB signals. The set is very sensitive rivaling some superhets. Selectivity and repeatability are poor. Very prone to Howls and Squeals.



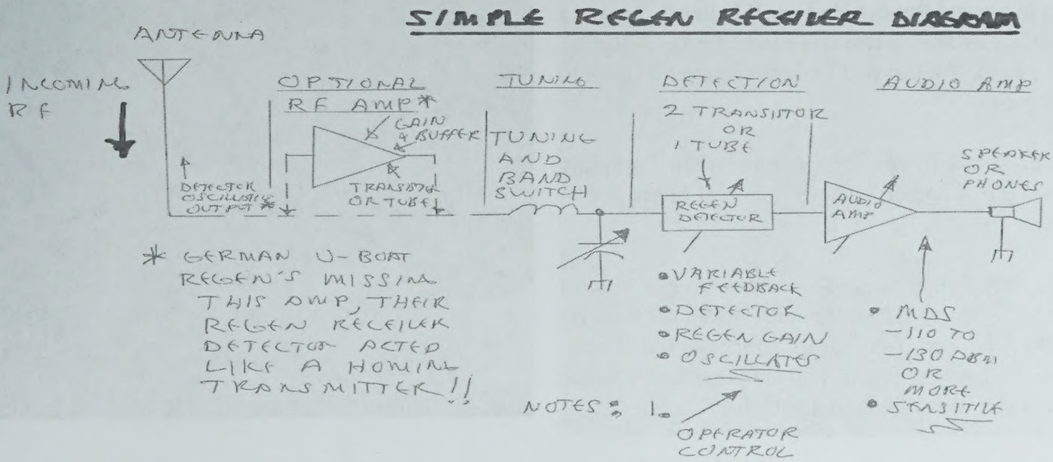
## Best of the Three:

Keeping in mind I built, tested and used all three of these regen receivers for several years, my favorite performer is the MFJ-8100K. Why? Simply put, this unit does not suffer from the squeal and howl problem. Additionally, tuning is smooth due to the vernier shaft tuning capacitor and requires no separate band spread control. On a scale of 0 to 10, I give the MFJ a 9, the Span Master a 8, and the Ten Tec a 6. Unfortunately, the Ten Tec is plagued with Squeals and Howls and additional scratchy potentiometer sounds by trying to pass RF over the wipers.

Simple Regen Block Diagram: Slanted arrows indicate operator controls.

The first block shows an optional radio frequency preamplifier, used to add gain, if necessary. If added, it helps in suppressing radiation (out the antenna) from the main regen circuit, which is inherently an oscillator.

The regen block is the heart of the receiver. Here several different actions are going on. Operator must set / compensate for band conditions, signal fading, strong nearby stations, BFO action if trying to detect CW or SSB, and the overall amount of oscillation required. Too little and receiver sounds totally dead. Too much and squeals and howls will drive you out of the room. Set just right results in great AM detection and good audio. Adjusting the frequency of the regen assists in receiving amateur radio CW and SSB (single side band audio) reception



## Rat Radio

by Ken Ladd

After my friend Cob Burandt and his buddies finished their rat rod he said “the true sign of a rat rod is not having much behind the garage when you’re done”. I saw a primer gray rat rod at a show with a bumper sticker the read SCREW SHINNY.

I went into this radio project with goal of using what was lying around and not buying anything unless I just had to. I bought an MRL 2 xtal kit and a one tube radio kit from Elmer Osterhoudt in the early 1970’s. When the B battery went dead I boxed up the one tube. The xtal set saw limited use with an attic antenna at our previous house.

That all changed last year. While visiting my mother I found a forlorn wooden shotgun shell case in a shed. I cleaned it up being careful not to make it glitzy. I made a hinged cover with a plywood scrap but had to buy some hinges. I made a lid restraint with a toilet flapper valve chain.

I used a surplus drawer pull to open the lid. I mounted two magnetic latches (had to buy one). I mounted the one tube on the left side of the lid and mounted the xtal set in a cutout on the right. I used chain from a toilet flapper valve to restrain the lid when it is open.

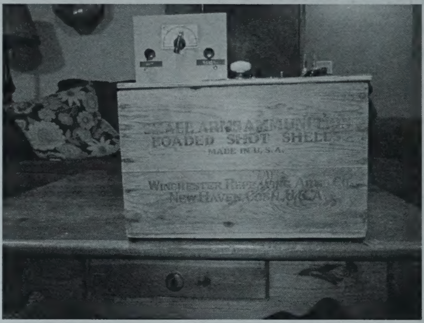
I bought some semi rigid foam which I lined the bottom of the case. I made cutouts for the plug in coils, spare xtals, tubes and batteries. Three nine volt batteries rest in a metal Band-Aide box (B battery). I made a one cell holder from a two cell holder for the A supply. I have a small V-8 can that I might slip over it (juice to run the tube).

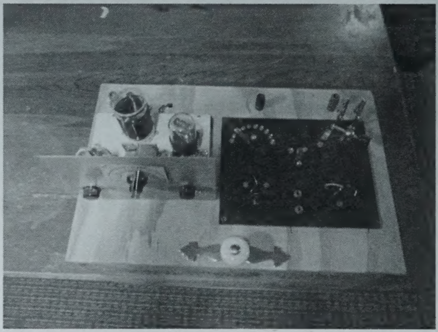
Oh yeah, I had to replace the tube when I stupidly switched the A and B leads (it was real bright for an instant).

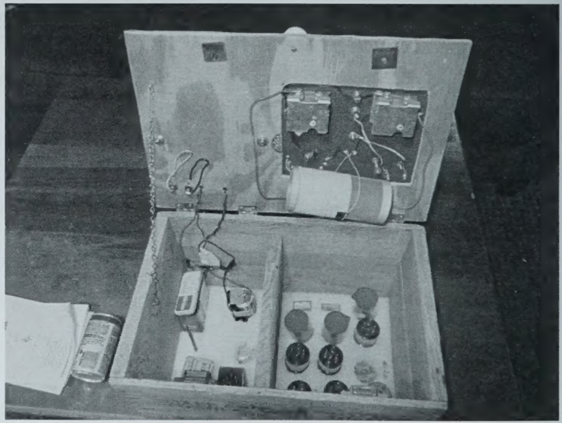
Using a fifty foot antenna the xtal set brought in local stations. Using Brandees phones I picked up690, 770, 830, 980, 1400 and 1500. Brush phones or sound powered ones would do better. I added posts and alligator clips so I can use a diode or a cat whisker.

The one tube brought these and more local stations but the shortwave amazed me. There was WWV, Family Radio, Radio Havana and foreign language stations. I also heard some ham sideband.

It is a thrill to sit quietly and listen. It brings back memories of the letters that Elmer sent with each order.







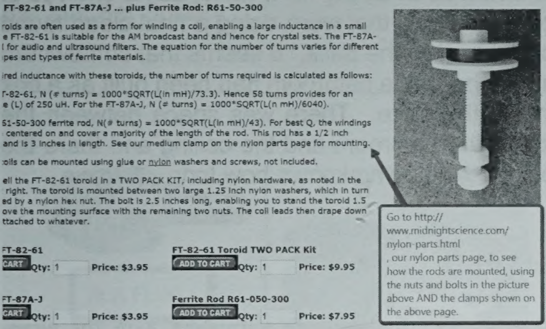
## Xtal Corner: Member Correspondence:

Sir/Madam, I purchased some loop stick coils from you recently, and was wondering if I could get some mounts made for them? Also mounts for potentiometers. Thank you for your time. Norman J Weimar Jr.

Hi Norman,

See the attached files for mounting the ferrite rods using our nylon parts.

Two nylon clamps are attached to the 1/2 inch diameter ferrite rod and the combo is mounted using 2-1/2 inch nylon bolts and nuts per the picture.
Hope that is helpful. http://www.midnightscience.com/nylon-parts.html



**FT-82-61 and FT-87A-J ... plus Ferrite Rod: R61-50-300**

roids are often used as a form for winding a coil, enabling a large inductance in a small
e FT-82-61 is suitable for the AM broadcast band and hence for crystal sets. The FT-87A-
l for audio and ultrasound filters. The equation for the number of turns varies for different
pes and types of ferrite materials.

ired inductance with these toroids, the number of turns required is calculated as follows:

T-82-61, N (# turns) = 1000*SQRT(L(in mH)/73.3). Hence 58 turns provides for an
e (L) of 250 uH. For the FT-87A-J, N (# turns) = 1000*SQRT(L(n mH)/6040).

61-50-300 ferrite rod, N(# turns) = 1000*SQRT(L(in mH)/43). For best Q, the windings
centered on and cover a majority of the length of the rod. This rod has a 1/2 inch
and is 3 inches in length. See our medium clamp on the nylon parts page for mounting.

oils can be mounted using glue or nylon washers and screws, not included.

ell the FT-82-61 toroid in a TWO PACK KIT, including nylon hardware, as noted in the
right. The toroid is mounted between two large 1.25 inch nylon washers, which in turn
ed by a nylon hex nut. The bolt is 2.5 inches long, enabling you to stand the toroid 1.5
ove the mounting surface with the remaining two nuts. The coil leads then drape down
ttached to whatever.

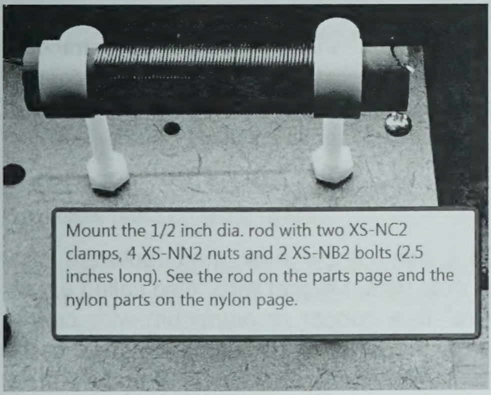
**T-82-61**
CART Qty: 1 **Price: $3.95**

**FT-82-61 Toroid TWO PACK Kit**
ADD TO CART Qty: 1 **Price: $9.95**

**T-87A-J**
CART Qty: 1 **Price: $3.95**

**Ferrite Rod R61-050-300**
ADD TO CART Qty: 1 **Price: $7.95**

Go to http://www.midnightscience.com/nylon-parts.html, our nylon parts page, to see how the rods are mounted, using the nuts and bolts in the picture above AND the clamps shown on the above page.



Mount the 1/2 inch dia. rod with two XS-NC2 clamps, 4 XS-NN2 nuts and 2 XS-NB2 bolts (2.5 inches long). See the rod on the parts page and the nylon parts on the nylon page.

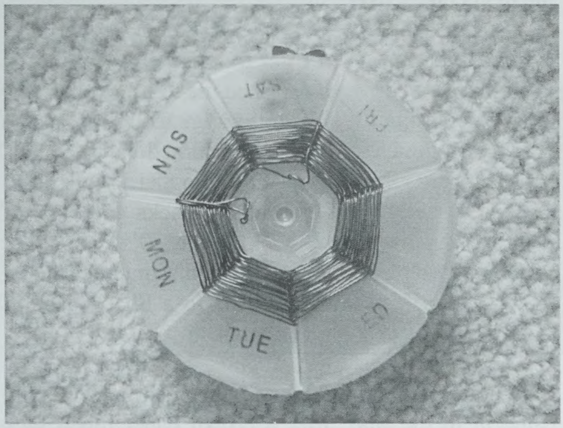
Greetings Patricia,

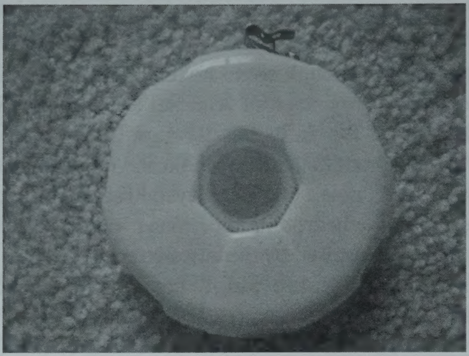
I was going through some boxes in the basement and came across my stack of Xtal Set Society Newsletters dating from the early 90s through 2007, right about when my granddaughter was born. I still have a real fine loose-coupled Oat Box crystal radio sitting on my dresser in the bedroom, but I haven't built much since then. I was inspired by the newsletters to build Michael Gasperi's Slide Rule Radio the other day and was surprised how well it worked on the stronger stations.

So, how's the state of the society? I was really interested in picking up shortwave with my crystal sets back in the day, but my favorite station on the 49 M band, WYFR-Radio Taiwan International, ceased broadcasting a few years ago. I noticed the Rap 'N Tap Forums have very few posts and many of the crystal radio kits of yore are no longer available. I've always been fascinated by AM radio, the distance it can travel and the simplicity of the receivers.

I've attached some photos of one of my recent shortwave crystal creations I dubbed the "Sundown Spider". I used a small, 7-section pill box wound with 32 turns of 26 gauge ? wire which yields about 50 uH. The piezo speaker is glued into the cap from a water bottle and the only other part is a germanium diode. It gets multiple stations at night fading in and out.

Well, I hope all is well and that AM radio will be around for a long while (I have my doubts). Best Regards, Ken Sambuchi





Hi Patricia,

I was curious about what your find was like over in Oklahoma where you were able to get all of that great Philmore stuff? Was it an old parts store that had been closed and someone tipped you off that they had items for sale or was it all in a box or basement somewhere? I love hearing about things like that. What was it like to walk in and see it all? Was it still on shelves?

Let me share one story with you. When I was a sophomore in college in 1993 I was back home in Asheville for the summer and was looking for a plastic trimmer capacitor. I remembered that I had seen it in a previous Radio Shack catalog so I got out the yellow pages and called the nearest Radio Shack to make sure they were in stock. It seems that they had just discontinued them, and after calling all the stores I only found one that had it. This store was listed as being a Radio Shack dealer, located in a Western Auto store over in Canton, NC in the next county over.

I drove over and when I got to Western Auto I asked about the part and the lady asked me to follow her. She led me over to to the side of the store, and down a step into an adjoining storefront. She turned on the lights, and there was a long forgotten Radio Shack with dusty stocked shelves containing blister packs and bags of parts going all the way back to the 70's. I couldn't believe it seeing some parts long discontinued that I remembered from my first visits to a Shack back in 1977 when I was in Kindergarten.

Side note: back in 1977 I had saved for a while and came in to the store with a brown paper lunch sack with 119 cents. I thought I was rich. My mom let me pick out a handful of carded parts and when the man checked me out, mom just paid whatever was owed as the $1.19 wouldn't cover it.

Ok. Back to 1993. I stood there dumbfounded at all the long obsolete semiconductors, resistors at 19 cents per card, tubes and tube tester, etc.

I still have a dream about twice a month that I somehow stumble into a long forgotten Radio Shack and find all the old parts and p-Box kits I remember still hanging on the pegboard.
Chris KD4PBJ

Chris,
Your story is probably more exciting than ours. The building in OK was about to be renovated and had been empty for a while, so no shelves of parts. People that were doing a final clean found boxes way in the back. It seems that somewhere along the way a bathroom had been built as a box inside the store. There was space between the top of the bathroom and the ceiling and there the boxes sat for who knows how long. Patricia

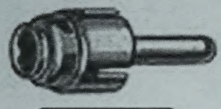
Ed Asked
:
1) If I can't find enough varnished wire for wrapping coils, is there a way I can varnish bare wire?
2) Does the wire for the oatmeal box radio have to be solid wire, or can I use stranded?
3) Does wire for any coil have to be copper?
4) And can I use # 6 aluminum wire from a piece of triplex service cable for an antenna? Thanks. Ed

Hi Ed

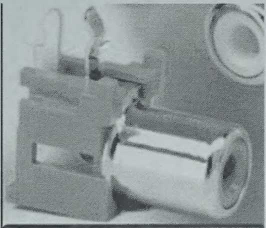
1 & 3) I don't know how manufacturers coat enamel onto wire. Magnet wire "also called enameled wire" is a copper or aluminum wire coated with a very thin layer of insulation. It is used in the construction of transformers, coils, etc and other applications that require tight coils (i.e. no spacing between the turns) of insulated wire. Copper

wire has less loss than aluminum so should be used unless the length of the wire is short. Copper is preferred for coils. By the way, one can use a soldering iron to "boil off" the enamel in order to solder the ends to a terminal, etc. 2) Both solid and stranded wire work well for AM band crystal sets. Many strands of enamel wire woven together - often called Litz wire - are preferred for crystal sets, due to the skin effect, wherein for high frequencies - particularly the HF AM band - the current flows only on or near the surface of the wire. No current flows at the center of those wire strands. As such, Litz wire has a lower resistance loss than solid wire and is therefore used if you wish to make a more efficient and weak signal crystal set. 4) #6 wire would work ok but is heavy. From AM band - 500 to 1500 kHz - #22 or #26 wire will work as well but is not nearly as heavy. Phil, W0XI, at the Xtal Set Society.

---



RCA PLUG



RCA JACK, PCB RIGHT ANGLE

### Audio Plugs and Jacks

The RCA plug is useful for audio as well as low-frequency radio projects. $1.00

A mating PCB jack (for RCA connector) installs at a right angle onto a printed circuit board or vector board; great for your next project. $1.25

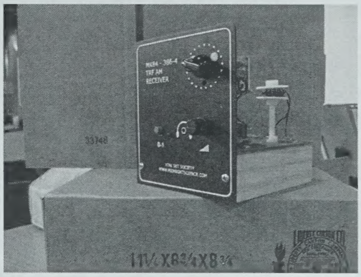
The TRS (tip-ring-sleeve) plug is used for stereo or mono audio connections. It has 3 solder connections and plastic sleeve. $1.50

### MK484 AM Radio Kit

This kit provides you with a great place to start for exploring and building kits for reception of AM broadcasts. The parts and instructions supplied with the full kit support reception of the broadcast band, roughly 550 to 1500 kHz. Increasing/decreasing the turns on the ferrite coil shifts reception down to a minimum of 180 kHz/maximum of 3,000 kHz, supported by the MK484.

The heart of the kit features the ubiquitous MK484 IC in a TO-92 transistor package coupled with our old friend, the 386-4 audio amp in an 8-pin DIP. Coupled with an external antenna, FT82-61 ferrite toroid (for tuning coil) and air-variable capacitor, the MK484 AM Radio Kit gets surprising results. The MK484 IC features stable operation and low current drain, while providing a complete RF amplifier chain, AM detection and AGC circuitry. The 4.0 by 2.5 inch PCB houses all of the electronics for the receiver except for external tuning coil, air-variable tuning capacitor, panel and chassis. Parts shipped with our full kit support reception of the standard AM band. Adding a fixed capacitor in series or parallel with the variable tuning capacitor and/or decreasing or adding turns to the ferrite core (or a combination of the two) allows for the reception at 180-550 kHz or above at 1500-3000 kHz. As with most of our kits, this one can be ordered 2 ways: 1) a *Partial Kit* based on the PCB and its components and 2) the *Full Kit* including the Partial Kit along with a laser engraved front panel, chassis, ferrite toroid and 365uuf air variable capacitor. You must supply your own 8 to 32 ohm headphones or a small 8-ohm speaker, assembly tools, masking tape, 9 volt battery and enthusiasm! The set can be operated without an external antenna and grounding system if you use a ferrite rod or loop antenna (neither provided). You can order the MK484 IC itself on the parts page.

MK484 partial kit $39.95.
MK484 full kit $64.95.



10-30-15

## THE XTAL SET SOCIETY

**e-mail: xtalset@sunflower.com**
**Phone: 405-517-7347**

We are dedicated to once again building and experimenting with radio electronics, often—but not always—through the use of the crystal set, the basis for most modern day radio apparatus. This newsletter helps support our goal of producing excellent quality technical books that encourage learning and building. To join the society and receive one year of the bi-monthly newsletter, remit $14.95 to The Xtal Set Society. Canadians, please remit US $15.95. Outside the US and Canada please remit US $21.95.

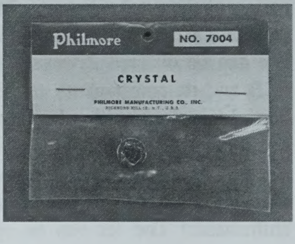
Please send articles and correspondence to the following address:
PO Box 3636, Lawrence KS 66046

NOTE: Unless otherwise stated, The Society assumes that the material you supply is fit for print (free of copyright or other infringements) and that by your submittal you have given us your permission to print the material without restriction.

*Founder &Columnist– Philip N. Anderson, W0XI*
*Editor & Queen Mum- Patricia, N0GZZ*
*Columnist- J.K. Fenton*
*Columnist- Dan Petersen, W7OIL email: dan.w7oil@gmail.com*

Occasionally in our coming and going, we come across some special items. These Philmore items were found on such a trip.

### Mounted Galena - Philmore 7004

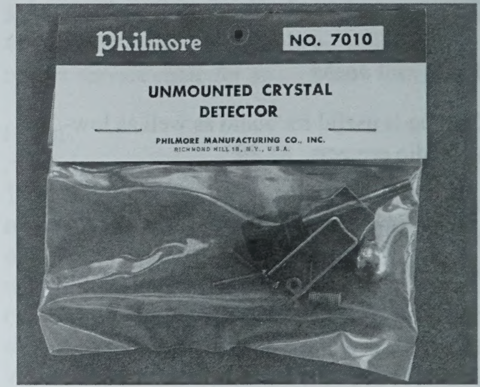

Philmore
NO. 7004
CRYSTAL
PHILMORE MANUFACTURING CO., INC.
RICHMOND HILL 18, N.Y., U.S.A.

The Philmore 7004 is a single mounted galena crystal; that is, the galena rock is set in a disc of woods metal. The disc fits in our brass cup holder found on our parts page. It also fits in a cup included in the Philmore 7010 Unmounted Galena Detector; see the next item. **Mounted Galena Philmore $4.95**

### Unmounted Crystal Detector Philmore 7010

The Philmore 7010 is an unassembled (unmounted) crystal detector kit. While a bit hard to see in the package, it consists of a handle on a rod, a cat whisker, a ball joint and U-shaped holder for the ball and rod, with screw and nut. **Unmounted Crystal Detector Philmore $5.95**

| | | | |
|---|---|---|---|
| **ORDER FORM (5/2013)**<br>Description | Cat# | Qty | Price |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Subscription The Xtal Set Society Newsletter 1 year | | | 14.95 |
| Subscription Canadian 1 year (in US dollars) | | | 15.95 |
| Subscription International 1 year (in US dollars) | | | 21.95 |
| | | | |
| Shipping (delete if subscription ONLY) 1st Class mail 1-2 items $5.95, 3-4 items $7.95, 5 or more $8.95<br>*{International orders specify surface or air-mail, shipping will be determined on a per order basis, please use VISA/MC only.}* | | | |
| TOTAL Kansas residents please add appropriate sales tax | | | |
| We accept checks, money orders, or VISA/MC | | | |
| VISA MC Card# | | EXP | |
| Signature: | | | |
| Name: | | | |
| Address: | | | |
| City State/Zip code: | | | |
| Phone<br>E-mail: | | | |
| Orders are filled promptly, but allow 2-3 weeks for delivery | | | |


Philmore
NO. 7010
UNMOUNTED CRYSTAL DETECTOR
PHILMORE MANUFACTURING CO., INC.
RICHMOND HILL 18, N.Y., U.S.A.